Hormones and Cell Regulation

European symposium: Volume 3

Edited by J. Dumont and J. Nunez
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As with so many conferences (especially those held in pleasant locations!) the INSERM meeting devoted to consideration of 'Hormones and Cell Regulation' appears to have become an annual event with the result that we are now presented with volume 3 of the proceedings. In their forward the editors state 'All authors have been asked to present a rather brief synthetic view of their subject and their research . . . However it is for non-specialists and students that this book is intended as it should give them brief authoritative introductions and syntheses of the state of the art in various fields without having to scan the very dispersed specialized articles'. Thus Drs Dumont and Nunez nailed the colours firmly to the mast. This series is to be an annual one devoted to evaluation of current advances in what might best be termed cellular endrocrinology. There can be no doubt of the need for such a series. Classically endocrinology has been the province of the physiologists and although a more molecular approach has been applied to interaction of hormones with their target organs there has until recently been little progress in understanding the molecular mechanisms involved in the control of hormone production and secretion. Furthermore the recent increases in understanding of membrane structure is now allowing approaches to the nature of the events within the membrane which constitute trans-membrane coupling. Clearly there is much to talk about but, one wonders, can specialists be persuaded to write in a manner comprehensible to the non-specialist particularly when in the interests of speed of publication editorial control is removed? As in most such endeavours the answer in the case of this volume is 'sometimes'!

The topics covered in volume 3 of the series include sections devoted to approaches to analysis of receptor–cyclase coupling (Schramm, Helmreich and Levitzki, and Gilman), protein phosphorylation mechanisms (England, Cohen and Hofmann), and control of hormonal secretion (Mauchamp, Hellman and Saez) as well as articles on the cytoskeleton (Weber and Osborn), the oestrogen receptor (Puca) and factors curiously named as NSILA (any relation to NASA?) and IGF (Froesch). Some of the articles notably those by Weber and Osborn and by Schramm are too short to be very useful except as a source of references to the work concerned. On the other hand that by Hellman on the role of Ca^{2+} in insulin secretion is a comprehensive treatment of the subject but at a level of detail which is perhaps inappropriate for the stated object of the volume. However, many of the articles, notably those by Helmreich and Levitzki, Gilman, England, Cohen and Saez, do strike a good balance between illustration of the principles involved in the approach(es) employed and presentation of the latest results and ideas. In this the reader is often helped by inclusion of an assessment of the discussion following each paper or group of papers written by one of the other participants. Although a few of these discussion summaries do little more than abstract the presentations in which they are based many are admirable in directing the reader's attention to salient principles and problems in the area under study. When done well such summaries are certainly more valuable than the edited (or verbatim) reports of discussion between participants which have a habit of focusing on trivia.

However while the discussion summaries are an excellent innovation the Editors will need to exert more control in some areas if the series is to reach its full and intended potential. The matter of very brief and relatively uninformative articles has been noted above. Another matter concerns the use of undefined abbreviations of which the worst example is the article by Froesch. The acronyms NSILA and IGF appear in

the title and are used throughout the text together with further subdivisions (NSILA-P, NSILA-S etc.) but are nowhere defined. In the case of IGF it is possible to ascertain that this stands for 'insulin-like growth factor' by reference to the previous article(!) and even to obtain from this latter some of the background information which would be so essential for students and non-specialists.

On balance therefore this volume is a useful summary of some of the growing points of cellular endocrinology. It is certainly a big improvement on volume 1 of this series and one hopes that further refinements will be forthcoming. The series is certainly one which should be available to those having research or teaching interests in this field.

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Molecular Biology and Pharmacology of Cyclic Nucleotides

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The monograph does not record the proceedings of the comprehensive discussion which is stated to be one of the primary aims of the symposium organised by the NATO Advanced Study Institute on cyclic nucleotides and held in Tremezzo (Como), Italy from 19–30 September 1977. None of the articles and in particular the reviews are enriched by a critical analysis of the scientific merit of the data presented on the biological role of cyclic nucleotides. The interesting paper on a biologist's view of computer simulation of the cyclic nucleotide system is buried in the centre and should have been given greater prominence at the beginning of the monograph. Similarly the reason for the siting of the article on recent advances in cyclic nucleotide radioimmunoassay is puzzling and not readily apparent. The mix of short communications on recent experiments and review papers is not suitably balanced. Furthermore, the typescript used by the publishers does not commend itself and would discourage all but the committed.

The real value of the monograph is in the review articles. The transduction steps between receptor activation and stimulation of adenylate cyclase are succinctly delineated, in particular the control exercised by guanine nucleotides and GTPase. Detailed information is provided on the partial purification of adenylate cyclase and its separation from closely associated membrane components, the nucleotide binding protein and hormone receptor units.

Of particular value are the articles on guanylate cyclase. The conceptual problem of transmitters and hormones activating a guanylate cyclase located in the cytoplasm is partially resolved by the finding of a low g separable membrane-bound enzyme with different properties from the solubilized form. The regulatory action of divalent cations, particularly calcium, is critically assessed. Calcium may be crucial in the activation of some receptors, but the probability that physiological activation of guanylate cyclase occurs independently of calcium must now be considered to be high, even though we still lack a full description of the physical environment that would produce clear hormonal or transmitter activation of guanylate cyclase in a cell free system.

The multiple molecular forms and regulation of cyclic nucleotide phosphodiesterases is also considered. The low K_m cyclic phosphodiesterase is believed to control basal levels of cyclic AMP and the high K_m enzyme to limit the maximum concentration achieved. The phosphodiesterase activated by the calcium-dependent protein appears to be the important physiological regulator of cyclic GMP. The selective inhibition of cyclic phosphodiesterase by drugs occurs through several mechanisms; one of these involves a